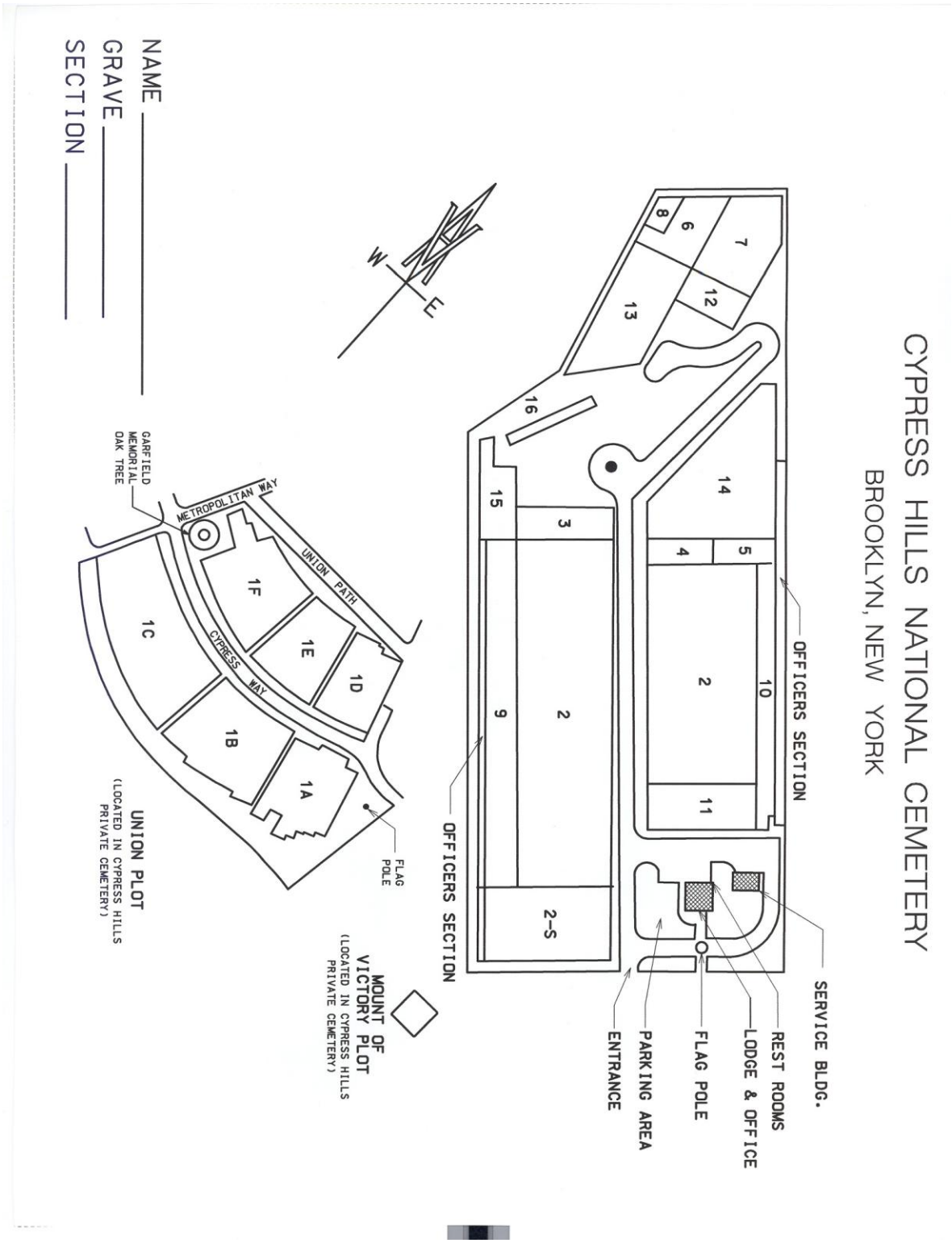
ATTACHMENT A



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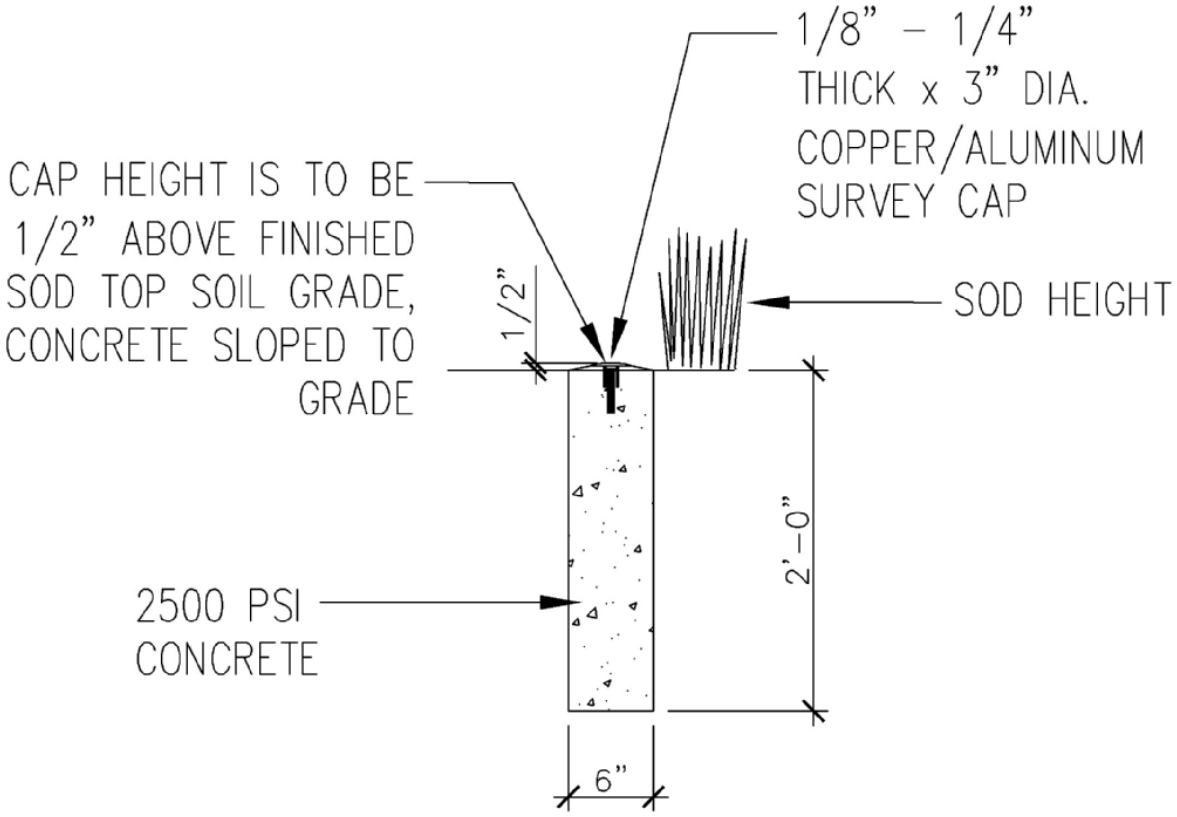
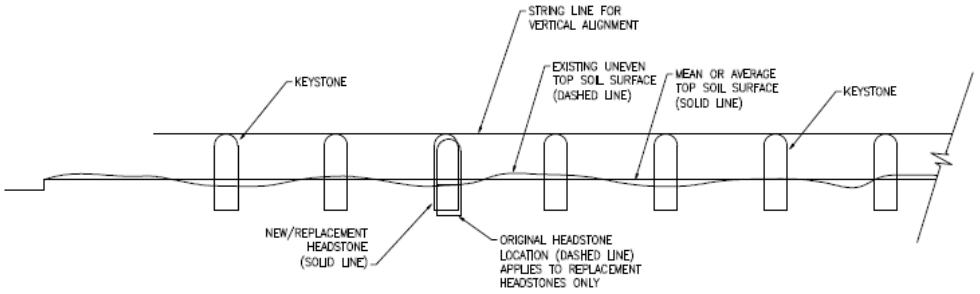


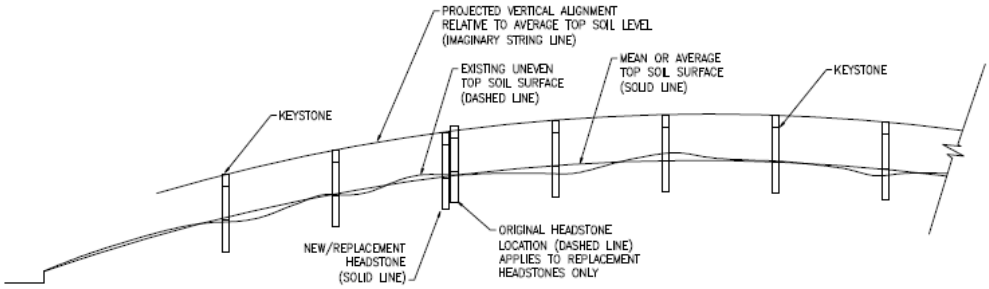
COPPER OR ALUMINUM SURVEY CAP

TYPICAL PERMANENT BURIAL
GRAVESITE CONTROL MARKER

ATTACHMENT C
ELEVATION VIEW OF BURIAL SECTION ALIGNMENT



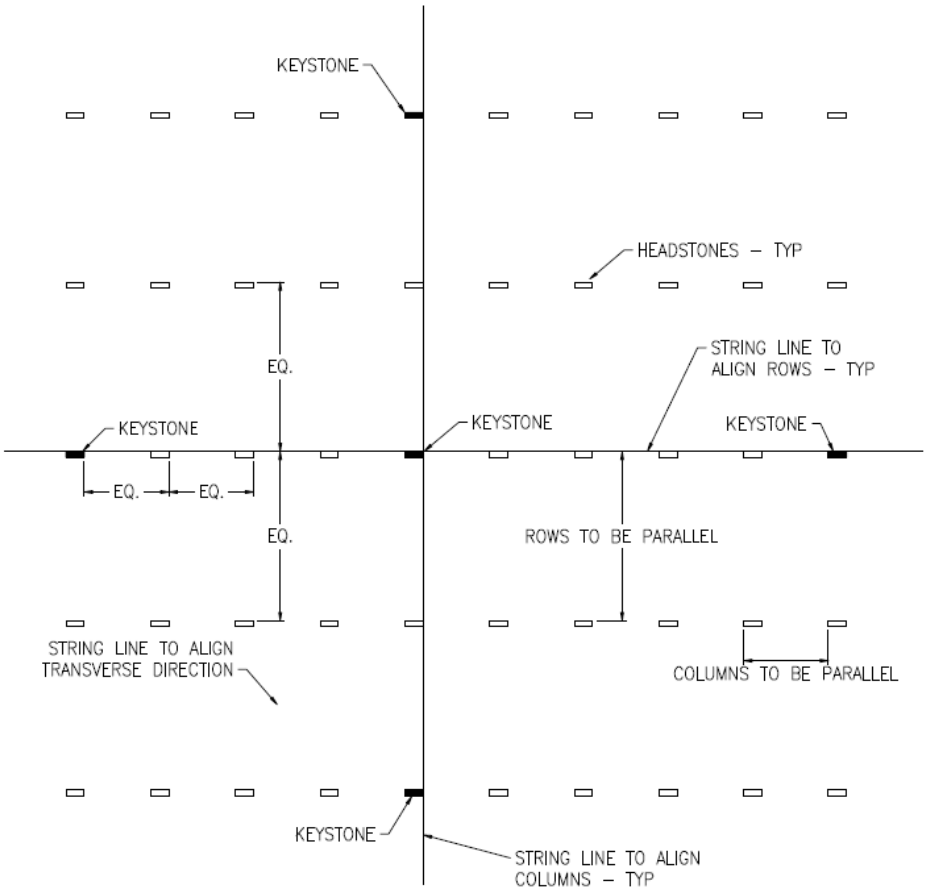
TYPICAL VERTICAL ALIGNMENT IN A FLAT SECTION



TYPICAL VERTICAL ALIGNMENT IN A SLOPED SECTION

ELEVATION VIEW OF
BURIAL SECTION ALIGNMENT

ATTACHMENT D
PLAN VIEW HEADSTONE ALIGNMENT



PLAN VIEW
HEADSTONE
ALIGNMENT

ATTACHMENT - E

SECTION 01340
SAMPLES AND SHOP DRAWINGS

1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in Section, GENERAL CONDITIONS.

1-2. For the purposes of this contract, samples (including laboratory samples to be tested), test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.

1-3. Contractor shall submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:

A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;

B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;

C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.

1-4. Forward submittals in sufficient time (a minimum of 10 calendar days, exclusive of mailing time) to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals (including any laboratory samples to be tested) shall not serve as a basis for extending contract time for completion.

1-5. Submittals will be reviewed for compliance with contract requirements by Contracting Officer, and action thereon will be taken by the Contracting Officer.

1-6. Upon receipt of submittals, Contracting Officer will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.

1-7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefore by Contracting Officer, adjustment in contract price and time will be made in accordance with Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.

1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and Architect-Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.

1-9. Submittals shall be submitted by Contractor only and shipped prepaid. Contracting Officer will assume no responsibility for checking quantities or exact numbers included in such submittals.

A. Submit samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.

B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail and shall contain the list of items, name of Cemetery, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.

1. A copy of letter shall be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Cemetery, name of Contractor, manufacturer, brand, contract number and ASTM or Federal Specification Number as applicable and location(s) on project.
3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.

C. In addition to complying with the applicable requirements specified in preceding Article 1.9, samples which are required to have Laboratory Tests under the separate sections of the specification shall be tested, at the expense of Contractor, in a commercial laboratory approved by Contracting Officer.
    1. Laboratory shall furnish Contracting Officer with a certificate stating that it is fully equipped and qualified to perform intended work, is fully acquainted with specification requirements and intended use of materials and is an independent establishment in no way connected with organization of Contractor or with manufacturer or supplier of materials to be tested.
    2. Certificates shall also set forth a list of comparable projects upon which laboratory have performed similar functions during past five years.
    3. Samples and laboratory tests shall be sent directly to approved commercial testing laboratory.
    4. Contractor shall send a copy of transmittal letter to the Contracting Officer with submission of material to a commercial testing laboratory.
    5. Laboratory test reports shall be sent directly to Contracting Officer for appropriate action.
    6. Laboratory reports shall list contract specification test requirements and a comparative list of the laboratory test results. When tests show that the material meets specification requirements, the laboratory shall so certify on test report.
    7. Laboratory test reports shall also include a recommendation for approval or disapproval of tested item.
D. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.
E. Approved samples will be kept on file by the Contracting Officer at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to

completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.

F. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.

1. For each drawing required, submit one legible photographic paper or vellum reproducible.
2. Reproducible shall be full size.
3. Each drawing shall have marked thereon, proper descriptive title, including Cemetery location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
7. When work is directly related and involves more than one trade, shop drawings shall be submitted to Contracting Officer under one cover.

1-10. Samples, shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to

Charles Mueller/Steve Turner
MSN I Engineer
5000 Wissahickon Avenue
Philadelphia, PA 19144-4867
Phone: (215) 381-3787

1-11. At the time of transmittal, the Contractor shall also send a copy of the complete submittal directly to the Contracting Officer.

- - - E N D - - -

ATTACHMENT - F

SECTION 01410
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained and paid for by Contractor.

1.2 APPLICABLE PUBLICATIONS:

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

B. American Association of State Highway and Transportation Officials (AASHTO):

T27-99..... Standard Specification for Sieve Analysis of Fine and Coarse Aggregates

T96-02..... Standard Specification for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

T99-01..... Standard Specification for the Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop

T104-99..... Standard Specification for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

T180-01..... Standard Specification for Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop

T191-02..... Standard Specification for Density of Soil In-Place by the Sand-Cone Method

T205-86(R1996)..... Standard Specification for Density of Soil In-Place by the Rubber-Balloon Method

T238-97..... Standard Specification for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

C. American Society for Testing and Materials (ASTM):

A325-2002..... Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

A370-2003..... Standard Test Methods and Definitions for Mechanical Testing of Steel Products

C31/C31M(REV. A)-2003 ..... Standard Practice for Making and Curing Concrete Test Specimens in the Field

C33-2003 ..... Standard Specification for Concrete Aggregates

C39/C39M-2001 ..... Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

C109/C109M-2002 ..... Standard Test Method for Compressive Strength of Hydraulic Cement Mortars

C138(REV. A)-2001..... Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete

C140(REV. A)-2002..... Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units

C143/C143M-2003 ..... Standard Test Method for Slump of Hydraulic Cement Concrete

C172-99 ..... Standard Practice for Sampling Freshly Mixed Concrete

C173-2001 ..... Standard Test Method for Air Content of freshly Mixed Concrete by the Volumetric Method

C1064/C1064M-2001 ..... Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete

C1077-2002 ..... Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

D698(REV. A)-2000..... Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort

D1556-00 ..... Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

D1557-2002 ..... Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort

D2167-94(R2001)..... Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

D2216-98 ..... Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

D2922-(2001) ..... Standard Test Methods for Density of soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D2974-(2000) ..... Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

D3740-(2001) ..... Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

E94-(2000) ..... Standard Guide for Radiographic Testing

E164-97..... Standard Practice for Ultrasonic Contact Examination of Weldments

E329-(2002) ..... Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used on Construction

E543-(2002) ..... Standard Practice for Agencies Performing Non-Destructive Testing

D. American Welding Society (AWS):

D1.1-02 ..... Structural Welding Code-Steel

1.3 REQUIREMENTS:

A. Accreditation Requirements: Testing Laboratory retained and paid for by Contractor, shall be accredited by one or more of the National Voluntary Laboratory Accreditation Program (NVLAP) programs acceptable in the geographic region for the project. Furnish to the Contracting Officer a copy of the Certificate of Accreditation and Scope of Accreditation. For testing laboratories that have not yet obtained accreditation by a NVLAP program, submit an acknowledgement letter from one of the laboratory accreditation authorities indicating that the application for accreditation has been received and the accreditation process has started, and submit to the Contracting Officer for approval, certified statements, signed by an official of the testing laboratory attesting that the proposed laboratory, meets or conforms to the ASTM standards listed below as appropriate to the testing field.

1. Laboratories engaged in testing of construction materials shall meet the requirements of ASTM E329.

2. Laboratories engaged in testing of concrete and concrete aggregates shall meet the requirements of ASTM C1077.
3. Laboratories engaged in testing of bituminous paving materials shall meet the requirements of ASTM D3666.
4. Laboratories engaged in testing of soil and rock, as used in engineering design and construction, shall meet the requirements of ASTM D3740.
5. Laboratories engaged in inspection and testing of steel, stainless steel, and related alloys will be evaluated according to ASTM A880.
6. Laboratories engaged in non-destructive testing (NDT) shall meet the requirements of ASTM E543.
7. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA.

B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by Contracting Officer. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of Contracting Officer to such failure.

C. Written Reports: Testing laboratory shall submit test reports to Contracting Officer, Contractor, and Local Building Authority within 24 hours after each test is completed unless other arrangements are agreed to in writing by the Contracting Officer. Submit reports of tests that fail to meet construction contract requirements on colored paper.

D. Verbal Reports: Give verbal notification to Contracting Officer immediately of any irregularity.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EARTHWORK:

A. General: The Testing Laboratory shall provide qualified personnel, materials, equipment, and transportation as required to perform the services identified/required herein, within the agreed to schedule and/or time frame. The work to be performed shall be as identified herein and shall include but not be limited to the following:

1. Observe fill and subgrades during proof-rolling to evaluate suitability of surface material to receive fill or base course. Provide recommendations to the Contracting

Officer regarding suitability or unsuitability of areas where proof-rolling was observed. Where unsuitable results are observed, witness excavation of unsuitable material and recommend to Contracting Officer extent of removal and replacement of unsuitable materials and observe proof-rolling of replaced areas until satisfactory results are obtained.

2. Provide part time observation of fill placement and compaction and field density testing in building areas and provide part time observation of fill placement and compaction and field density testing in pavement areas to verify that earthwork compaction obtained is in accordance with contract documents.
3. Provide supervised geotechnical technician to inspect excavation, subsurface preparation, and backfill for structural fill.

B. Testing Compaction:

1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with ASTM D698.
2. Make field density tests in accordance with the primary testing method following ASTM D2922. Field density tests utilizing ASTM D1556 shall be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they should provide satisfactory explanation to the Contracting Officer before the tests are conducted.

    a. Foundation Wall Backfill: One test per 30 m (100 feet) of each layer of compacted fill but in no case fewer than two tests.
    b. Trenches: One test at maximum 30 m (100 foot) intervals per 1200 mm (4 foot) of vertical lift and at changes in required density, but in no case fewer than two tests.
    c. Footing Subgrade: At least one test for each layer of soil on which footings shall be placed. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested subgrade when acceptable to Contracting Officer. In each compacted fill layer below wall footings, perform one field density test for every 30 m (100 feet) of wall. Verify subgrade is level, all loose or disturbed soils have been removed, and correlate actual soil conditions observed with those indicated by test borings.

C. Testing Materials: Test suitability of on-site and off-site borrow as directed by Contracting Officer.

3.2 SITE WORK CONCRETE:

Test site work concrete including materials for concrete as required in Article CONCRETE of this section.

3.3 CONCRETE:

A. Batch Plant Inspection and Materials Testing:
   1. Perform continuous batch plant inspection until concrete quality is established to satisfaction of Contracting Officer with concurrence of Contracting Officer and perform periodic inspections thereafter as determined by Contracting Officer.
   2. Periodically inspect and test batch proportioning equipment for accuracy and report deficiencies to Contracting Officer.
   3. Sample and test mix ingredients as necessary to insure compliance with specifications.
   4. Sample and test aggregates daily and as necessary for moisture content. Test the dry rodded weight of the coarse aggregate whenever a sieve analysis is made, and when it appears there has been a change in the aggregate.
   5. Certify, in duplicate, ingredients and proportions and amounts of ingredients in concrete conform to approved trial mixes. When concrete is batched or mixed off immediate building site, certify (by signing, initialing or stamping thereon) on delivery slips (duplicate) that ingredients in truck-load mixes conform to proportions of aggregate weight, cement factor, and water-cement ratio of approved trial mixes.

B. Field Inspection and Materials Testing:
   1. Provide a technician at site of placement at all times to perform concrete sampling and testing.
   2. Review the delivery tickets of the ready-mix concrete trucks arriving on-site. Notify the Contractor if the concrete cannot be placed within the specified time limits or if the type of concrete delivered is incorrect. Reject any loads that do not comply with the Specification requirements. Rejected loads are to be removed from the site at the Contractor's expense. Any rejected concrete that is placed will be subject to removal.
   3. Take concrete samples at point of placement in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with ASTM C31. Make at least three cylinders for each 40 m^3 (50 cubic yards) or less of each concrete type, and at

least three cylinders for any one day's pour for each concrete type. After good concrete quality control has been established and maintained as determined by Contracting Officer make three cylinders for each 80 m^3 (100 cubic yards) or less of each concrete type, and at least three cylinders from any one day's pour for each concrete type. Label each cylinder with an identification number. Contracting Officer may require additional cylinders to be molded and cured under job conditions.

4. Perform slump tests in accordance with ASTM C143. Test the first truck each day, and every time test cylinders are made. Test pumped concrete at the hopper and at the discharge end of the hose at the beginning of each day’s pumping operations to determine change in slump.
5. Determine the air content of concrete per ASTM C173. For concrete required to be air-entrained, test the first truck and every 20 m^3 (25 cubic yards) thereafter each day. For concrete not required to be air-entrained, test every 80 m^3 (100 cubic yards) at random. For pumped concrete, initially test concrete at both the hopper and the discharge end of the hose to determine change in air content.
6. If slump or air content fall outside specified limits, make another test immediately from another portion of same batch.
7. Perform unit weight tests in compliance with ASTM C138 for normal weight concrete and ASTM C567 for lightweight concrete. Test the first truck and each time cylinders are made.
8. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.
9. Verify that specified mixing has been accomplished.
10. Environmental Conditions: Determine the temperature per ASTM C1064 for each truckload of concrete during hot weather and cold weather concreting operations.
    a. When ambient air temperature falls below 4.4 degrees C (40 degrees F), record maximum and minimum air temperatures in each 24 hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.
    b. When ambient air temperature rises above 29.4 degrees C (85 degrees F), record maximum and minimum air temperature in each 24 hour period; record minimum relative humidity; record maximum wind velocity; record maximum temperature of surface of hardened concrete.

11. Inspect the reinforcing steel placement, including bar size, bar spacing, top and bottom concrete cover, proper tie into the chairs, and grade of steel prior to concrete placement. Submit detailed report of observations.
12. Observe conveying, placement, and consolidation of concrete for conformance to specifications.
13. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair of surface defects.
14. Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.
15. Observe preparations for placement of concrete:
    a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
    b. Inspect preparation of construction, expansion, and isolation joints.
16. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.
17. Observe concrete mixing:
    a. Monitor and record amount of water added at project site.
    b. Observe minimum and maximum mixing times.
18. Measure concrete flatwork for levelness and flatness as follows:
    a. Perform Floor Tolerance Measurements F_F and F_L in accordance with ASTM E1155. Calculate the actual overall F- numbers using the inferior/superior area method.
    b. Perform all floor tolerance measurements within 48 hours after slab installation and prior to removal of shoring and formwork.
    c. Provide the Contractor and the Contracting Officer with the results of all profile tests, including a running tabulation of the overall F_F and F_L values for all slabs installed to date, within 72 hours after each slab installation.
19. Other inspections:
    a. Grouting under base plates.
    b. Grouting anchor bolts and reinforcing steel in hardened concrete.

C. Laboratory Tests of Field Samples:
    1. Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one cylinder at 7 days and one cylinder at 28 days. Use remaining

cylinder as a spare tested as directed by Contracting Officer. Compile laboratory test reports as follows: Compressive strength test shall be result of one cylinder, except when one cylinder shows evidence of improper sampling, molding or testing, in which case it shall be discarded and strength of spare cylinder shall be used.

2. Make weight tests of hardened lightweight structural concrete in accordance with ASTM C567.
3. Furnish certified compression test reports (duplicate) to Contracting Officer. In test report, indicate the following information:
   a. Cylinder identification number and date cast.
   b. Specific location at which test samples were taken.
   c. Type of concrete, slump, and percent air.
   d. Compressive strength of concrete in MPa (psi).
   e. Weight of lightweight structural concrete in kg/m^3 (pounds per cubic feet).
   f. Weather conditions during placing.
   g. Temperature of concrete in each test cylinder when test cylinder was molded.
   h. Maximum and minimum ambient temperature during placing.
   i. Ambient temperature when concrete sample in test cylinder was taken.
   j. Date delivered to laboratory and date tested.

- - - E N D - - -

ATTACHMENT - G

SECTION 02200
EARTHWORK AND HEADSTONES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. This section includes the requirements for earthwork including, but not limited to, the following:

1. Site preparation.
2. Excavation.
3. Foundation Base Aggregate.
4. Filling and backfilling.
5. Grading.
6. Soil Disposal.

1.2 DEFINITIONS

A. Borrow Material: Borrow materials are soils generated during excavation operations at the site.

1. Backfill: Backfill shall be obtained from onsite excavation. The material shall be used as indicated on the Construction Drawings. It shall be free of organic matter, debris and other deleterious substances. The material shall contain no particles greater than 3 inches.

B. Unsatisfactory Materials: Materials that do not comply with the requirements listed above are unsatisfactory. Unsatisfactory materials also include non-engineered fills; trash; refuse; backfills from previous construction; and material classified as satisfactory that contain or are contaminated with unsatisfactory material. The Contracting Officer shall be notified of any contaminated materials.

C. Degree of compaction: Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698, abbreviated as a percent of laboratory maximum density.

D. Unauthorized excavation: Removal of materials beyond indicated sub-grade elevations or dimensions without written authorization by the Contracting Officer. No payment will be made for unauthorized excavation or remedial work required to correct unauthorized excavation.

1.3 RELATED WORK

A. Protection of existing utilities, fire protection services, existing equipment, roads, and pavements: Section 01010, GENERAL REQUIREMENTS.

1.4 SUBMITTALS

A. Unless otherwise noted, submittals shall be made 14 days before commencing the Work specified in this Section. The following shall be submitted in accordance with Section 01334 SAMPLES AND SHOP DRAWINGS.

1. Import Material: Contractor shall submit the following for each imported material a minimum of 14 days prior to delivery:
   a. Material source(s);
   b. Particle size analysis in accordance with ASTM C136
2. Equipment List: Contractor shall submit a list of equipment to be utilized for the work 7 days prior to mobilization. The list shall include equipment make, model, year, tire or track dimensions, weight and other information.
3. Construction Procedures Plan: Contractor shall submit a plan that includes, but not be limited to, material excavation, marker surveying and identification tagging, marker removal, marker collar removal, marker transportation and storage, marker re-installation, backfill processing and placement, equipment use, borrow source utilization, and protection to be provided in the event of rain, wind, heat or other potential cause of damage 14 days prior to material construction.
4. Record Drawing Information: Record Drawings including, but not limited to, drawings showing the original and final marker locations, foundation location including measurements and dimensions, shall be prepared by the Contractor and submitted to the Contracting Officer following completion of the project. The preconstruction survey of the markers shall be submitted to the Contracting Officer in draft form for use during construction.
5. Cleaning Agent: Contractor shall submit manufacturer's spec sheets on proposed cleaning agent(s) for approval.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Society for Testing and Materials (ASTM):

D698-00 ..... Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft^3 (600 kN m/m^3))

D1556-00 ..... Density and Unit Weight of Soil in Place by the Sand-Cone Method

D1557-00 ..... Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN m/m^3))

D2922-01 ..... Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D2940-98 ..... Graded Aggregate Material for Bases or Sub-bases for Highways or Airports

SS-2630 ..... State of Oregon Department of Transportation (ODOT) SS-2630 - (2006) Standard Specifications - Section 2630 - Base Aggregate

SS-2690 ..... State of Oregon Department of Transportation (ODOT) SS-2690 - (2006) Standard Specifications - Section 2690 – PCC Aggregates

1.6 UTILIZATION OF EXCAVATED MATERIALS

Contractor excavated and stockpiled materials shall be used as fill and backfill materials as specified. Excavated materials shall be stockpiled in designated stockpile areas. No excavated material shall be disposed of to obstruct the flow of any stream or road, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Foundation Base Aggregate shall be ¾ inch in conformance to ODOT SS-2630.

B. Leveling Sand shall be Sand for Mortar in conformance to ODOT SS-2690.

PART 3 – EXECUTION

3.1 SITE PREPARATION

A. Trees and Shrubs: Protect from damage, existing trees and shrubs which are not shown to be removed in construction area. Immediately repair damage to existing trees and shrubs by trimming, cleaning and painting damaged areas, including roots, in accordance with standard industry horticultural practice for the geographic area and plant species. Do not store building materials closer to trees and shrubs, that are to remain, than farthest extension of their limbs.

D. Stripping Topsoil: Strip topsoil from within limits of earthwork operations as specified. Topsoil shall be a fertile, friable, natural topsoil of loamy character and characteristic of locality. Topsoil shall be capable of growing healthy horticultural crops of grasses. Stockpile topsoil and protect as directed by Contracting Officer. Eliminate foreign materials, such as weeds, roots, stones, subsoil, frozen clods, and similar foreign materials larger than 0.014 m3 (1/2 cubic foot) in volume, from soil as it is stockpiled. Remove foreign materials larger than 50 mm (2 inches) in any dimension from topsoil to be used as backfill.

E. Lines and Grades: With the services of a Registered Professional Land Surveyor or Registered Civil Engineer, specified in Site Survey section, the contractor shall survey and document existing lines and grades and submit for approval, new lines and grades in order to achieve grades that provide a smooth surface, free from irregular surface changes. The intent here is not to change the overall contour of the gravesites, but rather to eliminate any irregular surface changes. Grading shall comply with compaction requirements and grade cross sections, lines, and elevations indicated by the approved survey. Where spot grades are indicated the grade shall be established based on interpolation of the elevations between the spot grades while maintaining appropriate transition at structures and paving and uninterrupted drainage flow into inlets.

3.2 EXCAVATION

A. Contractor shall perform excavation of every type of material encountered within the limits of grading to the lines, grades, and elevations indicated and as specified. Grading shall be in conformance with the Site Survey Drawings and the tolerances specified in Paragraph Grade Tolerance. Excavation areas shall be cleared of vegetation prior to excavation. Satisfactory excavated materials shall be transported to and placed in fill as indicated. Unsatisfactory materials encountered within the excavation shall be

excavated below grade and replaced with satisfactory materials as directed. Surplus excavated material not required for fill shall be disposed offsite.

B. Excavation of trenches shall be accomplished by cutting accurately to the dimensions shown on the Construction Drawings. Excessive open trench excavation shall be backfilled with satisfactory, thoroughly compacted, material. Contractor shall maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.3 SUBGRADE PREPARATION

A. Ground surface on which fill is to be placed shall be cleared of vegetation.

B. The subgrade shall be shaped to lines, grades, and sections shown on the Construction Drawings, and compacted as specified. Soft or otherwise unsatisfactory material shall be removed and replaced with satisfactory excavated material or other approved material as directed. Existing low areas and those resulting from removal of unsatisfactory material shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped and compacted as specified.

C. All subgrade areas shall be moisture conditioned and compacted to not less than 90 percent compaction in accordance with ASTM D2922.

D. If the Contractor excavates below the lines and grades indicated on the Construction Drawings, Contractor shall place fill to elevate these areas back to grade at no cost to the Government.

E. The prepared subgrade surface shall be reasonably smooth, free of holes, depressions greater than 3 inch deep, or protrusion extending above the surface more than 3 inch. No overlying materials shall be placed until the subgrade has been checked and approved. The subgrade surface shall be protected and restored if damaged.

3.4 FOUNDATION BASE AGGREGATE

A. Aggregate shall be placed in the bottom of the prepared trench subgrade and compacted. All areas shall be moisture conditioned and compacted to not less than 95 percent compaction in accordance with ASTM D2922.

B. Aggregate finish grades shall be constructed to within plus or minus 0.1 foot of the indicated grades. The finished surface of the aggregate shall be free of depressions and shall be reasonably smooth in accordance with the grade tolerance.

3.5 FILL AND BACKFILL

A. Fill shall be not be dropped from a height greater than 3 feet nor excessively loaded on markers. The soil shall be placed in the trench and compacted in 4 inch deep loose lifts. The moisture content of fill placed shall be adjusted prior to placement. Each lift shall be rough graded prior to compaction. Equipment shall be operated with careful attention to protection of markers. Fill shall not be constructed on surfaces that are muddy, frozen, or contain frost. Compact soil to not less than 95 percent compaction in accordance with ASTM D2922.

3.6 GRADE TOLERANCE

A. Excavation and finish grades shall be constructed to within plus or minus 0.1 foot of the indicated grades. The finished surface of the excavations and fills shall be free of depressions and shall be reasonably smooth in accordance with the grade tolerances.

3.7 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL

A. Remove from site and legally dispose trash and debris.

B. Remove from site and legally dispose excess soil after all fill and backfill operations are completed.

3.8 CLEAN UP

A. Upon completion of earthwork operations, clean all work areas within contract limits, remove tools, and equipment. Provide site clear, clean and free of debris. Remove all debris, rubbish, and excess material from Cemetery Property.

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ATTACHMENT - H

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies cast-in-place structural concrete and materials and mixes for other concrete.

1.2 RELATED WORK:

A. Materials testing and inspection during construction: Section 01410, TESTING LABORATORY SERVICES.

1.3 TESTING AGENCY FOR CONCRETE MIX DESIGN:

A. Testing agency retained and reimbursed by the Contractor and approved by Contracting Officer.

B. Testing agency maintaining active participation in Program of Cement and Concrete Reference Laboratory (CCRL) of National Institute of Standards and Technology. Accompany request for approval of testing agency with a copy of Report of Latest Inspection of Laboratory Facilities by CCRL.

C. Testing agency shall furnish equipment and qualified technicians to establish proportions of ingredients for concrete mixes.

1.4 TOLERANCES:

A. Formwork: ACI 117, except the elevation tolerance of formed surfaces before removal of shores is +0 mm (+0 inch) and -20 mm (-3/4 inch).

B. Reinforcement Fabricating and Placing: ACI 117, except that fabrication tolerance for bar sizes Nos. 10, 13, and 16 (Nos. 3, 4, and 5) (Tolerance Symbol 1 in Fig. 2.1(a), ACI, 117) used as column ties or stirrups is +0 mm (+0 inch) and -13 mm (-1/2 inch) where gross bar length is less than 3600 mm (12 feet), or +0 mm (+0 inch) and -20 mm (-3/4 inch) where gross bar length is 3600 mm (12 feet) or more.

C. Cross-Sectional Dimension: ACI 117, except tolerance for thickness of slabs 12 inches or less is +20 mm (+3/4 inch) and - 6 mm (-1/4 inch).

1.5 REGULATORY REQUIREMENTS:

A. ACI 315 – Details and Detailing of Concrete Reinforcement.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ACI 301 – Standard Specifications for Structural Concrete.

1.6 SUBMITTALS:

A. Testing Agency for Concrete Mix Design: Approval request including qualifications of principals and technicians and evidence of active participation in program of Cement and Concrete Reference Laboratory (CCRL) of National Institute of Standards and Technology and copy of report of latest CCRL, Inspection of Laboratory.

B. Test Report for Concrete Mix Designs: Trial mixes including water-cement ratio curves, concrete mix ingredients, and admixtures.

1.7 PRE-CONCRETE CONFERENCE:

A. General: At least 15 days prior to submittal of design mixes, conduct a meeting to review proposed methods of concrete construction to achieve the required results.

B. Agenda: Includes but is not limited to:

1. Submittals.
2. Coordination of work.
3. Availability of material.
4. Concrete mix design including admixtures.
5. Methods of placing, finishing, and curing.
6. Material inspection and testing.

C. Attendees: Include but not limited to representatives of Contractor; subcontractors involved in supplying, conveying, placing, finishing, and curing concrete; Contracting Officer; COTR.

1.8 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. Federal Specifications (Fed. Spec.):

MM-L-751H ..... Lumber Softwood

C. American Concrete Institute (ACI):

117-90 ..... Standard Specifications for Tolerances for Concrete Construction and Materials

117R-90 ..... Commentary on Standard Specifications for Tolerances for Concrete Construction and Materials

211.1-91 ..... Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

211.2-98 ..... Standard Practice for Selecting Proportions for Structural Lightweight Concrete

214-77 ..... Recommended Practice for Evaluation of Strength Test Results of Concrete

301-99 ..... Standard Specifications for Structural Concrete

304R-2000 ..... Guide for Measuring, Mixing, Transporting, and Placing Concrete

305R-99 ..... Hot Weather Concreting

306R-(R2002)..... Cold Weather Concreting

308-(R1997) ..... Standard Practice for Curing Concrete

309R-96 ..... Guide for Consolidation of Concrete

315-99 ..... Details and Detailing of Concrete Reinforcement

318/318R-02..... Building Code Requirements for Reinforced Concrete and Commentary

347R-(R1999)..... Guide to Formwork for Concrete

D. American National Standards Institute and American Hardboard Association (ANSI/AHA):

A135.4-95..... Basic Hardboard

E. American Society for Testing and Materials (ASTM):

A82-02..... Standard Specification for Steel Wire, Plain, for Concrete Reinforcement

A185-02..... Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement

A615/A615M-03 ..... Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

A653/A653M-03 ..... Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

A706/A706M-03 ..... Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

A767/A767M-00 REV.B..... Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement

A775/A775M-01 ..... Standard Specification for Epoxy-Coated Reinforcing Steel Bars

A820-01..... Standard Specification for Steel Fibers for Fiber-Reinforced Concrete

A996/A996M-03 REV.A..... Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement

C31/C31M-03..... Standard Practice for Making and Curing Concrete Test Specimens in the field

C33-03 ..... Standard Specification for Concrete Aggregates

C39/C39M-01..... Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

C94/C94M-03..... Standard Specification for Ready-Mixed Concrete

C143/C143M-00..... Standard Test Method for Slump of Hydraulic Cement Concrete

C150-02 REV. A..... Standard Specification for Portland Cement

C171-03 ..... Standard Specification for Sheet Materials for Curing Concrete

C172-99 ..... Standard Specification for Sampling Freshly Mixed Concrete

C173-01... ..... Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C192/C192M-02..... Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory

C231-97(E1999)..... Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

C260-01 ..... Standard Specification for Air-Entraining Admixtures for Concrete

C309-REV. A 98..... Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

C330-03 ..... Standard Specification for Lightweight Aggregates for Structural Concrete

C494/C494M-REV. A 99(E2001) Standard Specification for Chemical Admixtures for Concrete

C496-96 ..... Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

C567-00 ..... Standard Test Method for Density of Structural Lightweight Concrete

C618-03 ..... Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete

C666-03 ..... Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing

C881-02 ..... Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

C1107-02 ..... Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

D6-95(R2000)..... Standard Test Method for Loss on Heating of Oil and Asphaltic Compounds

D297-93(R2002)(E2003) ..... Standard Test Methods for Rubber Products-Chemical Analysis

D1751-99 ..... Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

D4397-02 ..... Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications

E1155-96(R2001)..... Standard Test Method for Determining FF

F. American Welding Society (AWS):

D1.4-98 ..... Structural Welding Code - Reinforcing Steel

G. Concrete Reinforcing Steel Institute (CRSI):

DA4-90 ..... Manual of Standard Practice

H. National Cooperative Highway Research Program (NCHRP):

Report No. 244-81..... Concrete Sealers for the Protection of Bridge Structures

I. U. S. Department of Commerce Product Standard (PS):

PS 1-83 ..... Construction and Industrial Plywood

J. U. S. Army Corps of Engineers Handbook for Concrete and Cement:

CRD C513-74..... Rubber Waterstops

CRD C572-74..... Polyvinyl chloride Waterstops

PART 2 – PRODUCTS:

2.1 MATERIALS:

A. Portland Cement: ASTM C150 Type I or II.

B. Coarse Aggregate: ASTM C33.

1. Size 67. Size 467 shall be used for footings and walls over 300 mm (12 inches) thick.
2. Coarse aggregate for applied topping, encasement of steel columns, and metal pan stair fill shall be Size 7.
3. Maximum size of coarse aggregates not more than one-fifth of narrowest dimension between sides of forms, one-third of depth of slabs, nor three-fourth of minimum clear spacing between reinforcing bars.

C. Fine Aggregate: ASTM C33. Fine aggregate for applied concrete floor topping shall pass a 4.75 mm (No. 4) sieve, 10 percent maximum shall pass a 150 µm (No. 100) sieve.

D. Mixing Water: Fresh, clean, and potable.

E. Admixtures:

1. Water Reducing Admixture: ASTM C494, Type A and not contain more chloride ions than are present in municipal drinking water.
2. Water Reducing, Retarding Admixture: ASTM C494, Type D and not contain more chloride ions than are present in municipal drinking water.
3. High-Range Water-Reducing Admixture (Super plasticizer): ASTM C494, Type F or G, and not contain more chloride ions than are present in municipal drinking water.
4. Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. Admixture manufacturer shall have long-term non-corrosive test data from an independent testing laboratory of at least one year duration using an acceptable accelerated corrosion test method such as that using electrical potential measures.
5. Air Entraining Admixture: ASTM C260.
6. Certification: Written conformance to the requirements above and the chloride ion content of the admixture prior to mix design review.

F. Reinforcing Steel: ASTM A615, or ASTM A996, deformed, grade as shown.

G. Reinforcing Bars to be Welded: ASTM A706.

H. Galvanized Reinforcing Bars: ASTM A767.

I. Supports, Spacers, and Chairs: Types which shall hold reinforcement in position shown in accordance with requirements of ACI 318 except as specified.

J. Sheet Materials for Curing Concrete: ASTM C171.

K. Liquid Membrane-forming Compounds for Curing Concrete: ASTM C309, Type I, with fugitive dye. Compound shall be compatible with scheduled surface treatment, such as paint and resilient tile, and shall not discolor concrete surface.

L. Epoxy shall be in conformance to ODOT SS-2070.

2.2 CONCRETE MIXES:

A. Mix Designs: Proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318.

1. If trial mixes are used, make a set of at least 6 cylinders in accordance with ASTM C192 for test purposes from each trial mix; test three for compressive strength at 7 days and three at 28 days.
2. Submit a report of results of each test series, include a detailed listing of the proportions of trial mix or mixes, including cement, admixtures, weight of fine and coarse aggregate per m^3 (cubic yard) measured dry rodded and damp loose, specific gravity, fineness modulus, percentage of moisture, air content, water-cement ratio, and consistency of each cylinder in terms of slump.
3. Prepare a curve showing relationship between water-cement ratio at 7-day and 28-day compressive strengths. Plot each curve using at least three specimens.
4. If the field experience method is used, submit complete standard deviation analysis.

B. After approval of mixes no substitution in material or change in proportions of approval mixes shall be made without additional tests and approval of Contracting Officer or as specified. Making and testing of preliminary test cylinders shall be carried on pending approval of cement, providing Contractor and manufacturer certify that ingredients used in making test cylinders are the same. Contracting Officer will allow Contractor to proceed with depositing concrete for certain portions of work, pending final approval of cement and approval of design mix.

C. Cement Factor: Maintain minimum cement factors in Table I regardless of compressive strength developed above minimums.

TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE

Concrete Strength		Non-Air-Entrained	Air-Entrained	
Min. 28 Day Comp. Str. MPa (psi)	Min. Cement kg/m^3 (lbs/c. yd)	Max. Water Cement Ratio	Min. Cement kg/m^3 (lbs/c. yd)	Max. Water Cement Ratio
25 (3000	300 (500)	*	310 (520)	*

* Determined by Laboratory in accordance with ACI 211.1 for normal concrete or ACI 211.2 for lightweight structural concrete.

D. Maximum Slump: Maximum slump, as determined by ASTM C143 with tolerances as established by ASTM C94, for concrete to be vibrated shall be as shown in Table II.

TABLE II - MAXIMUM SLUMP, MM (INCHES)*

Type of Construction	Normal Weight Concrete
Reinforced Footings and Substructure Walls	75mm (3 inches)

* Slump shall be increased by the use of the approved high-range water-reducing admixture (super plasticizer). Tolerances as established by ASTM C94. Concrete containing the high-range-water-reducing admixture shall have a maximum slump of 225 mm (9 inches). The concrete shall arrive at the job site at a slump of 50 mm to 75 mm (2 inches to 3 inches), and 75 mm to 100 mm (3 inches to 4 inches) for lightweight concrete. This should be verified, and then the high-range-water-reducing admixture added to increase the slump to the approved level.

E. Air-Entrainment: Air-entrainment of normal weight concrete shall conform with Table III. Air-entrainment of lightweight structural concrete shall conform with Table IV. Determine air content by either ASTM C173 or ASTM C231.

TABLE III - TOTAL AIR CONTENT FOR VARIOUS SIZES OF COARSE AGGREGATES (NORMAL CONCRETE)

Nominal Maximum Size of Total Air Content	Coarse Aggregate, mm (Inches) Percentage by Volume
10 mm (3/8 in).6 to 10	13 mm (1/2 in).5 to 9
20 mm (3/4 in).4 to 8	25 mm (1 in).3-1/2 to 6-1/2
40 mm (1 1/2 in).3 to 6	

F. Enforcing Strength Requirements: Test as specified in Section, TESTING LABORATORY SERVICES, during the progress of the work. Seven-day tests shall be used as indicators of 28-day strength. Average of any three 28-day consecutive strength tests of laboratory-cured specimens representing each type of concrete shall be equal to or greater than specified strength. No single test shall be more than 3.5 MPa (500 psi) below specified strength. Interpret field test results in accordance with ACI 214. Should strengths shown by test specimens fall below required values, Contracting Officer will

require any one or any combination of the following corrective actions, at no additional cost to the Government:

1. Require changes in mix proportions by selecting one of the other appropriate trial mixes or changing proportions, including cement content, of approved trial mix.
2. Require additional curing and protection.
3. If five consecutive tests fall below 95 percent of minimum values given in Table I or if test results are so low as to raise a question as to the safety of the structure, Contracting Officer will direct Contractor to take cores from portions of the structure. Use results from cores tested by the Contractor retained testing agency to analyze structure.
4. If strength of core drilled specimens falls below 85 percent of minimum value given in Table I, Contracting Officer will order load tests, made by Contractor retained testing agency, on portions of building so affected. Load tests in accordance with ACI 318 and criteria of acceptability of concrete under test as given therein.
5. Concrete work, judged inadequate by structural analysis, by results of load test, or for any reason, shall be reinforced with additional construction or replaced, if directed by the Contracting Officer.

2.3 BATCHING AND MIXING:

A. General: Concrete shall be "Ready-Mixed" and comply with ACI 318 and ASTM C94, except as specified. Batch mixing at the site is permitted. Mixing process and equipment will be approved by Contracting Officer. With each batch of concrete, furnish certified delivery tickets listing information in Paragraph 16.1 and 16.2 of ASTM C94. Maximum delivery temperature of concrete is 38^0C (100 degrees Fahrenheit). Minimum delivery temperature as follows:

Atmospheric Temperature	Minimum Concrete Temperature
-1. degrees to 4.4 degrees C (30 degrees to 40 degrees F)	15.6 degrees C (60 degrees F.)
-17 degrees C to -1.1 degrees C (0 degrees to 30 degrees F.)	21 degrees C (70 degrees F.)

1. Services of aggregate manufacturer's representative shall be furnished during the design of trial mixes and as requested by the Contracting Officer for consultation during batching, mixing, and placing operations of lightweight structural concrete. Services shall be required until field controls indicate that concrete of required quality

is being furnished. Representative shall be thoroughly familiar with the structural lightweight aggregate, adjustment and control of mixes to produce concrete of required quality. Representative shall assist and advise Contracting Officer.

PART 3 – EXECUTION

3.1 PLACING REINFORCEMENT:

A. General: Details of concrete reinforcement in accordance with ACI 318 and ACI 315, unless otherwise shown.

B. Placing: Place reinforcement conforming to CRSI DA4, unless otherwise shown.

1. Place reinforcing bars accurately and tie securely at intersections and splices with 1.6 mm (16 gauge) black annealed wire. Secure reinforcing bars against displacement during the placing of concrete by spacers, chairs, or other similar supports. Portions of supports, spacers, and chairs in contact with formwork shall be made of plastic in areas that shall be exposed when building is occupied. Type, number, and spacing of supports conform to ACI 315.

C. Spacing: Minimum clear distances between parallel bars, except in columns and multiple layers of bars in beams shall be equal to nominal diameter of bars. Minimum clear spacing is 25 mm (1 inch) or 1-1/3 times maximum size of coarse aggregate.

D. Splicing: Splices of reinforcement made only as required or shown or specified. Accomplish splicing as follows:

1. Lap splices: Do not use lap splices for bars larger than Number 36 (Number 11).
2. Welded splices: Splicing by butt-welding of reinforcement permitted providing the weld develops in tension at least 125 percent of the yield strength (fy) for the bars. Welding conform to the requirements of AWS D1.4. Welded reinforcing steel conform to the chemical analysis requirements of AWS D1.4.
    a. Submit test reports indicating the chemical analysis to establish weldability of reinforcing steel.
    b. Submit a field quality control procedure to insure proper inspection, materials and welding procedure for welded splices.
    c. Department of Veterans Affairs retained testing agency shall test a minimum of three splices, for compliance, locations selected by Contracting Officer.
3. Mechanical Splices: Develop in tension and compression at least 125 percent of the yield strength (fy) of the bars. Stresses of transition splices between two reinforcing bar sizes based on area of smaller bar. Provide mechanical splices at locations

indicated. Use approved exothermic, tapered threaded coupling, or swaged and threaded sleeve. Exposed threads and swaging in the field not permitted.

a. Initial qualification: In the presence of Contracting Officer, make three test mechanical splices of each bar size proposed to be spliced. Department of Veterans Affairs retained testing laboratory will perform load test.

b. During installation: Furnish, at no additional cost to the Government, one companion (sister) splice for every 50 splices for load testing. Department of Veterans Affairs retained testing laboratory will perform the load test.

E. Bending: Bend bars cold, unless otherwise approved. Do not field bend bars partially embedded in concrete, except when approved by Contracting Officer.

F. Cleaning: Metal reinforcement, at time concrete is placed, shall be free from loose flaky rust, mud, oil, or similar coatings that shall reduce bond.

G. Future Bonding: Protect exposed reinforcement bars intended for bonding with future work by wrapping with felt and coating felt with a bituminous compound unless otherwise shown.

3.2 PLACING CONCRETE:

A. Preparation:

1. Remove hardened concrete, wood chips, shavings and other debris from forms.
2. Remove hardened concrete and foreign materials from interior surfaces of mixing and conveying equipment.
3. Have forms and reinforcement inspected and approved by Contracting Officer before depositing concrete.
4. Provide runways for wheeling equipment to convey concrete to point of deposit. Keep equipment on runways which are not supported by or bear on reinforcement. Provide similar runways for protection of vapor barrier on coarse fill.

B. Bonding: Before depositing new concrete on or against concrete which has been set, thoroughly roughen and clean existing surfaces of laitance, foreign matter, and loose particles.

1. Preparing surface for applied topping:

a. Remove laitance, mortar, oil, grease, paint, or other foreign material by sand blasting. Clean with vacuum type equipment to remove sand and other loose material.

b. Broom clean and keep base slab wet for at least four hours before topping is applied.

c. Use a thin coat of one part Portland cement, 1.5 parts fine sand, bonding admixture; and water at a 50: 50 ratio and mix to achieve the consistency of thick paint. Apply to a damp base slab by scrubbing with a stiff fiber brush. New concrete shall be placed while the bonding grout is still tacky.

C. Conveying Concrete: Convey concrete from mixer to final place of deposit by a method which shall prevent segregation. Method of conveying concrete subject to approval of Contracting Officer.

D. Placing: For special requirements see Paragraphs, HOT WEATHER and COLD WEATHER.

1. Do not place concrete when weather conditions prevent proper placement and consolidation, or when concrete has attained its initial set, or has contained its water or cement content more than 1 1/2 hours.
2. Deposit concrete in forms as near as practicable in its final position. Prevent splashing of forms or reinforcement with concrete in advance of placing concrete.
3. Do not drop concrete freely more than 3000 mm (10 feet) for concrete containing the high-range water-reducing admixture (super plasticizer) or 1500 mm (5 feet) for conventional concrete. Where greater drops are required, use a tremie or flexible spout (canvas elephant trunk), attached to a suitable hopper.
4. Discharge contents of tremies or flexible spouts in horizontal layers not exceeding 500 mm (20 inches) in thickness, and space tremies such as to provide a minimum of lateral movement of concrete.
5. Continuously place concrete until an entire unit between construction joints is placed. Rate and method of placing concrete shall be such that no concrete between construction joints shall be deposited upon or against partly set concrete, after it's initial set has taken place, or after 45 minutes of elapsed time during concrete placement.
6. On bottom of members with severe congestion of reinforcement, deposit 25 mm (1 inch) layer of flowing concrete containing the specified high-range water-reducing admixture (super plasticizer). Successive concrete lifts shall be a continuation of this concrete or concrete with a conventional slump.
7. Concrete on metal deck:
   a. Concrete on metal deck shall be minimum thickness shown. Allow for deflection of steel beams and metal deck under the weight of wet concrete in calculating concrete quantities for slab.

1) The Contractor shall become familiar with deflection characteristics of structural frame to include proper amount of additional concrete due to beam/deck deflection.

E. Consolidation: Conform to ACI 309. Immediately after depositing, spade concrete next to forms, work around reinforcement and into angles of forms, tamp lightly by hand, and compact with mechanical vibrator applied directly into concrete at approximately 450 mm (18 inch) intervals. Mechanical vibrator shall be power driven, hand operated type with minimum frequency of 5000 cycles per minute having an intensity sufficient to cause flow or settlement of concrete into place. Vibrate concrete to produce thorough compaction, complete embedment of reinforcement and concrete of uniform and maximum density without segregation of mix. Do not transport concrete in forms by vibration.

1. Use of form vibration shall be approved only when concrete sections are too thin or too inaccessible for use of internal vibration.
2. Carry on vibration continuously with placing of concrete. Do not insert vibrator into concrete that has begun to set.

3.3 HOT WEATHER:

Follow the recommendations of ACI 305 or as specified to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete. Methods proposed for cooling materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by Contracting Officer.

3.4 COLD WEATHER:

Follow the recommendations of ACI 306 or as specified to prevent freezing of concrete and to permit concrete to gain strength properly. Use only the specified non-corrosive, non-chloride accelerator. Do not use calcium chloride, thiocyantes or admixtures containing more than 0.05 percent chloride ions. Methods proposed for heating materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by Contracting Officer.

3.5 PROTECTION AND CURING:

A. Conform to ACI 308: Initial curing shall immediately follow the finishing operation. Protect exposed surfaces of concrete from premature drying, wash by rain and running water, wind, mechanical injury, and excessively hot or cold temperatures. Keep concrete not covered with membrane or other curing material continuously wet for at least 7 days

after placing, except wet curing period for high-early-strength concrete shall be not less than 3 days. Keep wood forms continuously wet to prevent moisture loss until forms are removed. Cure exposed concrete surfaces as described below. Other curing methods shall be used if approved by Contracting Officer.

1. Liquid curing and sealing compounds: Apply by power-driven spray or roller in accordance with the manufacturer's instructions. Apply immediately after finishing. Maximum coverage 10m^2/L (400 square feet per gallon) on steel troweled surfaces and 7.5m^2/L (300 square feet per gallon) on floated or broomed surfaces for the curing/sealing compound.
2. Plastic sheets: Apply as soon as concrete has hardened sufficiently to prevent surface damage. Utilize widest practical width sheet and overlap adjacent sheets 50 mm (2 inches). Tightly seal joints with tape.
3. Paper: Utilize widest practical width paper and overlap adjacent sheets 50 mm (2 inches). Tightly seal joints with sand, wood planks, pressure-sensitive tape, mastic or glue.

3.6 CONCRETE SURFACE PREPARATION:

A. Metal Removal: Unnecessary metal items cut back flush with face of concrete members.

B. Patching: Maintain curing and start patching as soon as forms are removed. Do not apply curing compounds to concrete surfaces requiring patching until patching is completed. Use cement mortar for patching of same composition as that used in concrete. Use white or gray Portland cement as necessary to obtain finish color matching surrounding concrete. Thoroughly clean areas to be patched. Cut out honeycombed or otherwise defective areas to solid concrete to a depth of not less than 25 mm (1 inch). Cut edge perpendicular to surface of concrete. Saturate with water area to be patched, and at least 150 mm (6 inches) surrounding before placing patching mortar. Give area to be patched a brush coat of cement grout followed immediately by patching mortar. Cement grout composed of one part Portland cement, 1.5 parts fine sand, bonding admixture, and water at a 50:50 ratio, mix to achieve consistency of thick paint. Mix patching mortar approximately 1 hour before placing and remix occasionally during this period without addition of water. Compact mortar into place and screed slightly higher than surrounding surface. After initial shrinkage has occurred, finish to match color and texture of adjoining surfaces. Cure patches as specified for other concrete. Fill form tie holes which extend entirely through walls from unexposed face by

means of a pressure gun or other suitable device to force mortar through wall. Wipe excess mortar off exposed face with a cloth.

C. Upon removal of forms, clean vertical concrete surface that is to receive bonded applied cementitious application with wire brushes or by sand blasting to remove unset material, laitance, and loose particles to expose aggregates to provide a clean, firm, granular surface for bond of applied finish.

3.7 CONCRETE FINISHES:

A. Concrete surfaces shall not require additional finishing.

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ATTACHMENT - I

HEADSTONE ALIGNMENT AND CLEANING

I.1 HEADSTONE REMOVAL, RESETTING, AND BACKFILL REQUIREMENTS:

(a) WORK OVERVIEW

(i) This section outlines Headstone Removal, Resetting and Backfill services, defined as: work consisting of extracting, removal of concrete collar, resetting, aligning, backfilling, and compacting at headstones that are to be reset in the new Marker Grid Support System, as well as inventorying and assuring accurate placement on gravesites at the Cypress Hills National Cemetery.

(ii) The Contractor shall provide all supervision, professional advice/guidance, labor, parts, materials, equipment, transportation and personnel, to provide the services defined herein.

(b) RECORD KEEPING AND REPORTING

(i) The Contractor's Superintendent or his designee shall provide the COTR(s) with weekly written accurate reports identifying the following:

- All headstones shall be recorded by listing deceased names or headstone numbers on paper for each gravesite location and in the consecutive order of each gravesite row.
- These lists shall be provided on not less than a weekly basis, and shall identify all of the above work that took place within the previous seven calendar days.

(ii) The site manager shall also provide upon request a plan of action for the upcoming week, regarding headstones, locations and specific areas where work is being scheduled to occur at.

(c) **HEADSTONE REMOVAL – TO ELIMINATE ANY CHANCE OF A HEADSTONE BEING PLACED ON THE WRONG GRAVE DURING THE COURSE OF THE RAISE / REALIGNMENT PROJECT IT IS NOW STANDARD NCA POLICY THAT HEADSTONES ARE NOT TO BE PHYSICALLY REMOVED FROM THE GRAVESITE. THE FOLLOWING PROCEDURES WILL BE FOLLOWED BY BOTH THE CEMETERY DIRECTOR / COTR AND THE CONTRACTOR BEFORE THE RAISE / REALIGNMENT PROCESS BEGINS**

The contractor's Superintendent (or his designee) and COTR (or COTR's Representative(s)) shall conduct a joint gravesite inspection and verification prior to the removal of any upright headstones, flat markers and private headstones to document the location and accuracy of all existing conditions. The COTR will provide a printout of the burial records (BOSS) for this purpose with the following data fields. Section, Row, First and last name of the deceased. Upon completion of this joint survey, both the contractor's Superintendent and COTR shall certify the accuracy, as noted and initialed, by signing the burial record printout.

Upon completion of the resetting and realignment of the headstones and markers, contractor's Superintendent and COTR re inspect and verify the accuracy of the placement of headstone and marker on the correct gravesite. Upon completion of this second joint survey, both the contractor's Superintendent and COTR shall certify the accuracy by re-signing the burial record printout.

Headstones are not to be damaged while remaining on the grave and the Contractor will elevate them off of the ground during the realignment process in order to protect them from damage or being discolored from dirt or soil.

(i) Standard marble headstones are approximately 42 inches long, 13 inches wide, and 4 inches thick, approximate weight: 230 pounds.

(ii) Removal of the concrete collar (if applicable) from the Headstone shall be performed according to the following Government specified procedure:

- Excavate the Headstone to sufficient depth to fully expose the top of the collar.
- Pre-drill each collar in at least two locations, at opposite ends, 8" deep with a 1/2" drill bit.
- Crack collar in half with a lightweight jackhammer using a 4" spade bit. The jackhammer should be placed as close as possible to the Headstone's front face at a slight angle from vertical.
- Lift the Headstone from the ground.
- The contractor shall not attempt to remove the Headstone from the ground while the collar is still attached. Any Headstone broken as a result of not following the specified procedure shall be replaced at the contractor's expense.
- If this procedure damages or breaks any headstone, stop work on removing any more headstones and notify the Contracting Officer immediately for direction.

(iii) Headstones without concrete collars shall be removed from their sockets by using wooden, and or metal clamps. If metal clamps are used the area that contacts the headstone must be protected with a rigid fabric that shall prevent damage to, and marking of, the headstone. Clamps shall be attached to a Bob Cat or similar Machine to extract headstone from socket. Use care not to scratch or damage headstones in any manner. (Note: In areas where smaller than standard size headstones may occur, coordinate specified measurements and dimensions of required work with COTR)

(d) HEADSTONE ALIGNMENT:

(i) The measurements between rows of headstones and headstones within each row may differ from one section to the next, discuss with COTR where this is found to occur. These measurements shall be adhered to as closely as possible. Some variances may be allowed in order to keep a uniform appearance of headstones being aligned. Headstones shall be accurately and precisely reinstalled on the correct gravesites with the utilization of temporary grave plotting maps, existing permanent control markers where available, and temporary contractor installed control markers accurately and precisely installed at the ends of each gravesite row

(ii) The alignment crew starts on a row of headstones and headstones are chosen to be “key” stones. These keystones are ones that are visibly in line with the majority of the rest of the headstones in the row, and are as close as possible to the proper measurements for that section of headstones. “Key” stones shall be chosen and utilized at a maximum of every 10th headstone (or more frequently in areas of rolling terrain). These keystones shall then be aligned by leveling front and back and side-to-side, and raised or lowered to a height of 24-26 inches above topsoil level.

(iii) Heavy strings or lines shall run along the backs, sides, and tops of these keystones. These lines shall be marked with the proper measurements- (size of section) for the section being aligned. All remaining headstones in the row shall then be aligned along the strings front to back and side-to-side even with the measured marks on the line. Each headstone shall also raised or lowered as necessary to ensure a uniform measurement of 24-26 inches above topsoil level. Each headstone shall be leveled and plumbed front to back and side-to-side keeping the back of the headstone along the string and the side of the headstone along the measured mark. Maximum vertical, lateral, and transverse tolerance of any headstone off the alignment string lines and/or marks shall be 1/8”, or less.

(iv) At the start of work in each burial section, the first row of reset/realigned headstones in each burial section will be inspected by COTR for appearance, spacing, depth, alignment, plumbness, height, accuracy, and smoothness in grade transition. No further setting of headstones shall be done until this first row has been inspected and accepted by the COTR. It is the Contractors responsibility to notify the COTR 24 hours in advance of when each of these inspections will be needed.

(v) The alignment of the headstones shall be checked frequently during this process because the tamping may move the headstone out of level or off the mark on the line. This process of raising and realigning shall be repeated for each row of headstones. Headstones in all completed work areas shall be firmly set and anchored in place with no movement from forces subjected by the COTR. Leveling sand shall be placed and compacted between the Headstone and Headstone support block to secure the Headstone in alignment.

(vi) Any headstones broken or damaged by the Contractor shall be reported to the Cemetery Administrator or COTR by close of business each working day in order that the grave can be properly marked. The Contractor shall be responsible for the cost of the headstone replacement. All headstone replacements shall be coordinated with the COTR. Any grid or sectional monuments disturbed, displaced or broken shall be replaced by the Contractor at his cost. All grid or sectional monuments disturbed, etc., shall be properly reset by a licensed land surveyor at Contractor’s expense. Curbs, roads, walks, turf, trees, utilities, etc. existing above and below the ground that are damaged or disturbed by the contractor during performance of contract work shall be repaired at the expense of the contractor. Repairs to the above shall be corrected by the Contractor within fourteen (14) workdays, unless otherwise agreed to with the COTR.

(vii) All measurements and string line set ups/row layouts shall be taken from existing established burial section layout control point grid monuments when these are

available, not from previously set headstones, unless otherwise directed by the COTR. Prior to starting work in each burial section, coordinate the correct grid control monument and grave row/grave spacing layout dimensioning requirements with COTR. In irregular terrain where sloping and uneven ground conditions exist, all headstones shall be set at proper heights and levels to provide a flowing transition through uneven terrain. The completed headstones in all soil and terrain conditions shall be anchored firmly in place so that the headstones are rigid with no give or play.

(viii) Contractor shall inspect and measure each headstone when removed and document any headstones greater in length than the standard 42". At the contractor's option and at no additional cost to the Government, the contractor can either adjust the depth of the footing to accommodate the longer headstone(s) or cut the headstone to the standard length of 42". Cutting to size shall be accomplished locally.

I.2 HEADSTONE CLEANING:

(a) HEADSTONE CLEANING GENERAL INFORMATION: The Contractor shall provide all labor, parts, equipment, supplies, transportation and personnel required to provide headstone/marker cleaning services.

(b) DEFINITION: "Clean" under this contract means: The headstones/markers shall contain NO discoloration, environmental deposits, mold, mildew, moss, algae, lichen, dirt/mud, grass clippings, grass marks, bird droppings, etc.

(c) CONTRACTOR DUTIES AND RESPONSIBILITIES:

All equipment and supplies maintained and operated by the Contractor shall be consistent and fully compliant with all applicable Federal, State, and County laws, ordinances and regulations and meet State inspection, safety, licensing, registration, and insurance requirements.

(d) RECORD KEEPING AND REPORTING:

The Contractor's Superintendent shall provide the COTR(s) with weekly written accurate reports identifying the following:

(i) All headstones cleaned shall be recorded per gravesite location.

(ii) These lists shall be provided on not less than a weekly basis, and shall identify all of the above work that took place within the previous seven calendar days.

(e) CLEANING OF HEADSTONES:

(i) All temporary markers, floral, commemorative, or other types of decorations (arrangements) causing interference with the cleaning of headstones shall be carefully and orderly moved from and, upon completion of the cleaning of the headstones/markers moved back to the gravesite by the Contractor.

(ii) Cleaning techniques shall demonstrate a clear understanding of, and the sensitivity to, such environmental issues as ground water contamination, wetlands, etc., and shall be consistent and fully compliant with all applicable Federal, State, and County laws, ordinances and regulations. Clean water shall be used to clean headstones and flat markers. Cleaning techniques with water shall include high pressure spraying, hand scrubbing, and rinsing. When water under pressure is used, such pressure shall not be greater than 600 psi. Excessive staining and/or discoloration may be removed with pressurized water and a stiff nylon brush (no wire brushes, bleach, or abrasive cleaners shall be permitted) followed by rinsing with clear water. Use caution to prevent damaging bronze faceplates of the flat markers. If water used in cleaning should soften the soil around the base of the headstone so that the headstone is loosened, care shall be taken not to tip the headstone out of plumb or alignment. Care shall be taken to protect the turf area from damage. Any turf damaged by the Contractor shall be restored at Contractor's expense. Headstones shall be set and anchored firmly in place with no movement from forces subjected by the COTR or inspector after cleaning has been completed.

(iii) After cleaning in accordance with Paragraph (ii) above, apply a final heavy spray application of a biocidal cleaner such as D/2 Biological Solutions (manufactured by Sunshine Makers) or Enviro Clean Bio-wash (manufactured by PROSOCO) to all sides of the headstone at a 50/50 water dilution rate, followed minimum 2 weeks later by pressurized water rinsing. Contractor shall submit the required Material Safety Data Sheets (MSDS) to the COTR prior to use of any chemicals.

(iv) Headstones that have been cleaned but become marked, discolored, dirt covered, or muddied due to subsequent contract work including but not limited to turf reestablishment issues shall be re-cleaned at no additional cost to the government. Headstones that become discolored, dirt covered, or muddied, etc. after initial cleaning has been completed, but prior to acceptance, shall be re-cleaned at no additional cost to the government.

I.3 WARRANTY:

(a) The Contractor is to warranty all work for a period of one (1) year after final acceptance by the government, unless normal accepted commercial practice specifies differently.

(b) Any headstone adjust, realign, reset, and/or backfill workmanship that does not meet the specified requirements (including specified tolerance requirements) before the end of this guaranty period is to be reworked, adjusted, and corrected by Contractor at no additional cost to the government.

(c) Work performed under the warranty shall be corrected within ten (10) workdays from receipt of notification or as directed by the COTR.

ATTACHMENT - J

SITE SURVEY
Cypress Hills National Cemetery
Brooklyn, New York

J.1 GENERAL: The contractor shall perform all surveying services necessary to provide a headstone location/elevation and topographic survey of existing at the Cypress Hills National Cemetery, Brooklyn, New York (Cemetery). This survey shall form the basis for developing the final grade and installing the headstone support footing at the proper elevations in order to achieve proper headstone alignment.

J.2 PROJECT LIMITS: The area to be surveyed shall include the all sections or portions thereof, at the Cypress Hills National Cemetery that are to be renovated as part of this contract. Unless indicated on the plan or approved by the Contracting Officer (CO), the survey limits shall extend to a minimum of 20 feet beyond the sections being renovated. The survey shall locate each headstone (Upright or Flat) and record the position and elevation, and the contour of the grade.

J.3 SUBMITTAL REQUIREMENTS: The Contractor shall submit the following to the MSN I Engineer according to the project schedule:

(a) An electronic copy of existing conditions: Headstone layout in reference to control monumentation, existing headstone elevations and existing topographic survey based on spot elevations.

(b) New Headstone Elevations and finished grading plan: Based on the survey of existing headstone elevation and topographic survey, the contractor shall develop and submit for approval a final headstone elevation plan and finished grade elevation plan.

J.4 SPECIFICATIONS FOR HEADSTONE AND TOPOGRAPHIC SURVEY:

(a) Contour Interval: Contours shall be indicated by broken lines, drawn at one-foot intervals, or otherwise approved or required interval.

(b) Spot Elevations: Spot elevations shall be provided on an approximate 50 foot minimum grid pattern, and at all other appropriate locations where site features, structures, or utilities require greater detail to illustrate existing conditions. Provide spot elevations at the top and bottom of abrupt changes in grade.

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ATTACHMENT - K

SURFACE RENOVATION & TURF GRASS RE-ESTABLISMENT

K.1 Turf Renovation with Seed: **As the optimum time for establishing cool season turf from seed in the Northeastern United States is from mid - late August through early October it is strongly advised that the Contractor only perform the turf renovation portion of this project during this time period to insure that the best possible stand of turf is provided as part of the contract.** This time period is more conducive to better overall grass seed germination and turf establishment due to the favorable conditions which include less chance of competition with summer growing / germinating weeds, cooler evenings and warm days which favor seed germination, soil temperatures that favor seed germination and better opportunity for rainfall that will help to keep the seedbed moist. The Contractor is required to deliver a well established stand of grass from seed. This includes 90% seed germination and areas of turf that are actively growing, healthy, full and generally free of any bare areas and broadleaf / grassy weeds.

(a) General: Soil samples shall be collected from each section and be submitted to a certified soil-testing laboratory two to three weeks prior to the intended re-seeding operation to determine fertility and pH adjustment requirements. The results shall be provided to the COTR for review and approval.

(i) Existing turf and weeds shall be killed, removed and replaced with new grass seed.

(ii) The area shall be expertly graded and seeded resulting in a uniform stand of turf, high quality in appearance, with the tops of all upright headstones 24 inches above the soil or to a measurement as directed by the COTR.

(iii) Physical Limits of Turf Work: New grass seed shall be applied to the full extent of the section, or part thereof, up to the boundary limits as defined by the curbs, trees or garden edge, fence, property line or mid-way between two sections. See specifications for grading, soil preparation and distribution of seed.

(b) Vegetation Removal: After the preparatory mowings, the entire vegetated area shall be sprayed with a non-selective herbicide (Round up or equivalent).

(i) Application rate shall be at the maximum label recommended rate for the complete elimination of the existing turfgrass and weeds. Product label instructions shall be followed for elapsed time before moving to the next procedure to allow the herbicide to fully affect the plant material.

(ii) After a minimum of three or more preparatory mowings, the entire vegetated area within the sections shall be sprayed with Round-Up Pro herbicide or an equal non selective glyphosate product that will kill all existing turf and weeds. Application rate shall be the maximum label recommended rate for the complete elimination of perennial grass species and contaminant weeds. Application to be made by a licensed State of New York pesticide applicator. After the initial application the Contractor will **allow 7 days for the herbicide to fully trans-locate throughout all plant parts to sufficiently kill the existing turf and weeds**. After this seven day waiting period, the sections will then be inspected by the Contractor and the COTR to determine if the initial herbicide application

has sufficiently killed all turf and weeds within the sections. **If the initial application has not killed all of the existing vegetation within the sections then a second application of Roundup will be applied to kill any remaining grass and weeds. Due to the fact that these sections are currently infested with numerous tough to control broadleaf weeds such as clover and wild chrysanthemum it is imperative that all of these weeds be killed before the next step in the renovation process begins.**

(iii) The area shall then be irrigated to force the growth of any remaining plant material. When there is sufficient re-growth, the area shall be retreated with the non-selective herbicide, again following the product label directions for time to elapse for the herbicide to fully affect the plants, before the start of tillage. This will take place no later than ten days (10) after the initial herbicide application.

(iv) Dead plant debris shall be removed or ground up to no larger than ½ inch and tilled to a depth of no less than 4 inches.

(c) Lines and Grades: Area shall be tilled, graded and compacted to a level to provide a smooth and flowing transition through uneven terrain and to avoid any appearance of layering of soil. Contractor shall use a laser level or similar device to maintain grade lines.

(i) Contractor shall establish lines and grades for approval by COTR or designee. Grades shall conform to elevations to provide a smooth transition at curbs, trees, planters and uninterrupted drainage flow into existing drains, and to prevent any "scalping" of the new turfgrass when mowed.

(ii) Contractor shall request COTR approval of lines and grades. Contractor shall be responsible for any additional cut and/or fill required to ensure that the site is graded to conform to elevations as determined by the COTR.

(iii) The areas within the drip lines of existing trees shall not be tilled at a depth greater than three inches or backfilled not to exceed two inches from existing grades, or as approved by the COTR. Any damage to tree roots shall be avoided.

(iv) Contractor shall protect all trees, shrubs and plants. Plant material damaged, weakened or killed during the renovation shall be replaced with its equivalent. Exceptions will be approved by the COTR.

(d) Filling and back filling: Contractor shall not fill/backfill until all foreign materials have been removed from the excavation. For fill and backfill use excavated materials and/ or Contractor furnished topsoil as applicable. Contractor shall not use unsuitable excavated materials (clay, sticks, rocks, concrete, plant material etc). Soil excavated from the work area shall be acceptable, providing it meets the criteria as stated in section f. "Topsoil" below. (Note: Contractor shall till killed grass and weed material back into the soil in place of removing from site. However, if this is done, the contractor shall be responsible for removing any and all weeds and grasses not of the same variety of that which was specified and approved for a period of 6 months.)

(e) Compaction: Compact with approved tamping rollers, sheepsfoot rollers, pneumatic tired rollers, steel wheeled rollers, or other approved equipment (hand or mechanized) well suited to

soil being compacted. Do not operate mechanized vibratory compaction equipment, which may damage existing liners or caskets. The Contractor shall not operate trucks, tractors, and other heavy equipment in excess of five tons on any turf area except when authorized in writing by the COTR(s). Sub-terrain shall be thoroughly tamped to prevent further sinkage but the soil shall not be compacted to the degree that it prevents the growth of healthy turf.

(f) Topsoil: Topsoil shall be of uniform quality, natural, friable, and compatible in texture with the existing soil to prevent a perched water table. Topsoil shall be free of: foreign matter; objects larger than 15 mm. in any dimension; toxic substances; weed seeds, any material or substances that may be harmful to plant growth, and shall be of the proper PH to produce healthy, high quality turf. The Contractor shall be responsible to control any weeds during the maintenance period. When used for fill to bring the area to the correct grade, proper soil management techniques shall be used to prevent excessive soil compaction and/or a perched water table that shall result in poor turf growth.

(g) Apply Fertilizer, Final Grading: The area shall be expertly graded and seeded to result in a uniform stand of turf, high quality in appearance.

(i) Fertilizer and any other soil amendments essential for healthy turf growth (The fertilizer /amendment application shall be high in phosphorous and provide no greater than 1 pound of Nitrogen and at least 1 pound of Phosphorous per 1,000 square feet. Typical analysis are 10-20-10, 5-20-10, 5-10-5) shall be roto-tilled into the soil to a depth of at least 3 inches to uniformly mix fertilizer, soil amendments and topsoil as part of the finish grading operation.

(ii) Restore the soil to an even condition before applying seed by rolling with a standard turfgrass roller filled with water. Two applications of fertilizers are required, one prior to seed application and one after the first mowing.

(iii) The finished seed bed shall be fine in texture and firmly compacted and free of any plant or other debris greater than ½ inches. All irregularities in the finished surface shall be corrected to eliminate depressions and high spots. All finished topsoil areas shall be protected from damage from vehicular or pedestrian traffic.

(iv) The Contractor shall install and maintain erosion control and storm water pollution prevention material/methods to meet Federal, State, and local requirements. Contractor shall comply with all applicable Federal, State, and local environmental laws and regulations.

(v) Valve boxes, sprinkler heads and related irrigation components are to be adjusted to the final grade.

(vi) Complete turf renovation only after areas are brought to the final grade as approved by the COTR.

(h) Seed Specifications: Seed shall be produced from Blue Tag certified seed and State of New York certified. The composition of the grass species in the seed mixture shall be a mix of 60% Kentucky Bluegrass and 40% Perennial Ryegrass. Each grass variety shall be a blend of at least 3 regionally adapted cultivars. The grass seed mixture shall be weed-free.

(i) Prior to distribution of the seed, the COTR(s) will inspect the work area. Any discrepancies in the ground preparation shall be corrected prior to the broadcasting of seed in the work area. Prior to seeding, the COTR will have the right to inspect and to assess the acceptability and quality of the proposed seed. The COTR will have the right to reject poor quality seed before installation.

Seed will be applied evenly throughout the entire section by dividing the total seed required into two equal quantities and using a broadcast seeding spreader such as a Cyclone or Lely spreader to spread seed in two directions at right angles to each other. Seed will be applied at a rate of 7 lbs. / 1,000 sq. ft.

After seed has been evenly applied, the Contractor will lightly rake the seed into the top ¼ to ½ inch of the soil. The soil will then be rolled with a standard turf grass roller half full of water to firm the seedbed.

(ii) The seedbed shall be kept moist immediately after it has been applied and until the seed has begun germination, rooted and is able to survive without standard watering. Water will be applied to the seed to sufficiently soak through to the soil bed to insure that the entire seedbed is moist and firmly in place on the soil bed.

(i) Irrigation Systems: After applying the seed, the Contractor shall ensure that all irrigation heads, control boxes, and related components are at finished grade, aligned correctly and in proper working order (if applicable). Any damage to the irrigation system caused by the Contractor shall be repaired by the Contractor in a timely manner to prevent loss of turf at no cost to the Government.

(j) Installed Irrigation Systems (If Applicable): Cemetery personnel will test and demonstrate to the Contractor all irrigation systems and hardware prior to the start of work in any area. This inspection shall be documented in the weekly work report. The Contractor shall remove store and cap the irrigation heads while work is in progress. The Contractor shall replace irrigation heads at ground level consistent with finish grade and in correct alignment, make all adjustments, repairs or corrections required to complete the renovation; ensuring all irrigation lines are free of foreign matter and return the irrigation system and hardware to a level which shall correctly water new and existing vegetation**.**

(k) Requests to Irrigate: Requests to irrigate newly applied seed, to include amount and frequency, shall be made to and approved by the Cemetery Director, or her designee. Access to and programming of the irrigation control boxes will be performed by cemetery personnel at the direction of the Cemetery Director or designee. Contractor shall not manually override the electronic irrigation control system unless specifically authorized to do so by the Cemetery Director, or her designee. **The Cypress Hills National Cemetery does not have an in ground irrigation system**.

(l) Erosion, Particulate Matter Control and Storm Water Run Off: Contractor shall Install and maintain erosion control material/methods to meet Federal, State, and local requirements. Copies of these requirements will be reviewed by contacting the COTR(s). As necessary, the Contractor shall install measures including, but not limited to, sedimentation fences and protection of storm drain inlets. Contractor shall is solely responsible to meet with all Federal, State and local requirements for air quality, dust and particulate matter control. The Contractor shall be fully responsible for the control of any dust carried by the wind and shall take the appropriate preventative measures.

K.2 Turf Establishment Period:

(a) The Establishment Period for turf shall begin immediately after complete seeding of a section(s) with the approval of the COTR or designee, and continue for 60 days, at which time the Government will perform the final “turf inspection” and acceptance for that particular section(s). For example, if seed in section A is installed on August 30th then the Contractor is required to water the seed as needed to maintain its overall health, germination and vigor until October 30th.

(b) During the 60 days Turf Establishment Period, the Contractor shall:

(i) Eradicate all weeds. Fertilize, re-seed, and perform any other operation necessary to promote the growth of uniform, healthy, high quality turf. The Contractor shall irrigate to keep the seed moist and healthy to promote rooting but shall be also responsible to carefully conserve water. An established turf area will be an area that has 90% of seed applied that is fully germinated, healthy and growing. The turf area will be free of any large bare areas and also generally free of any broadleaf or grassy weeds.

(ii) Replant areas void of turf 1/2 ft2 (one –half square foot) and larger in area.

(iii) Begin mowing with newly sharpened mower blades when grass is 100 mm (4 inches) high to a height of 65 mm (2-1/2 inch to 3 inches) and maintain the turf at that height. Never remove more than 1/3 the leaf surface in a single mowing.

(iv) Turf shall also be trimmed around the headstones and markers to the same height of the surrounding turf without scalping.

K.3 Clean Up and Repair Of Damaged Areas:

(a) Upon completion of the work, the Contractor shall remove all debris, rubbish, and excess material from Cemetery Property.

(b) A temporary storage site shall be provided by the cemetery for short-term storage. Contractor shall provide own storage container for tools, equipment, and materials purchased for performance on this contract. Storage container shall not exceed 22 ft in length and can only be placed where approved by COTR.

(c) At the end of each day the Contractor shall remove all debris from the work site to disposal areas. The Contractor shall ensure at all times that rubbish and trash generated by the Contractor shall be removed from paved areas and is kept clear of vehicular and pedestrian traffic throughout the site. The Contractor shall not dispose of organic matter on site. The Contractor shall be fully responsible for disposal of debris. The Government will not provide receptacle(s) for disposal of debris related to this contract. All unsuitable/unusable materials shall be disposed of off station.

(d) Contractors shall be responsible for cleaning any cemetery structures that are soiled or stained as a result of contractor’s performance. The Contractor shall wash-down with water all soiled or stained structures and grounds at the end of each workday. No chemicals shall be used during the wash down. The Contractor shall bear all costs

associated with washing and cleaning. Any such soiled or stained areas shall be brought to the immediate attention of the COTR(s) prior to washing/cleaning.

(e) In areas where planting and turf work have been completed, clear the area of all debris, spoil piles, and containers. Clear all other paved areas when work in adjacent areas is completed. Remove all debris, rubbish and excess material from the Cemetery.

(f) The contractor and COTR(s) will inspect the trees and shrubbery of a scheduled renovation area prior to the start of the renovation and note all abnormalities or existing conditions. Another inspection will be conducted after the completion of the renovation and the contractor shall make all corrective actions to any noted damage. A licensed arborist shall complete all corrective actions to damaged trees at the Contractor's expense.

(g) Where existing or new turf areas have been damaged or scarred during planting and construction operations, the Contractor shall restore disturbed area to their original condition.

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ATTACHMENT – L

CONSTRUCTION RELATED DEAD TREE REMOVAL

SERVICE REQUESTS

(a) Service Requests may include (but are not limited to) complete tree removal / stump grinding, pruning / removal of dead or severely declining trees and clean-up of debris. All such service requests shall be as determined necessary by the Government COTR.

(b) Procedure: Upon request, Contractor will submit a written proposal to the COTR estimating the amount of time (hours) necessary to accomplish the work involved. The Contractor's proposal shall be approved in writing by the COTR prior to commencement of work. All work and services shall be performed at the fixed hourly rate indicated in the Price Schedule. VA National Cemetery reserves the right to purchase services from sources other than the Contractor when determined to be in the best interest of the Government.

(c) TREE REMOVAL / STUMP GRINDING: Where circumstances warrant the complete removal of a tree(s), removal shall be accomplished under the instruction and guidance of a Certified Arborist provided by the Contractor. All trees shall be topped prior to falling and all limbs over 3 ½" in diameter must be lowered to the ground by ropes. The stumps are to be ground to a maximum of 4" below soil level, or to the lateral roots, if reached before the specific depth. The Contractor shall never grind the stumps to the depth that would interfere with the roots of any adjacent tree(s) that the Government intends to retain. The cavity of the stump is to be filled with topsoil and tamped to meet the existing grade.

All wood chip particles and debris from the tree removal shall be cleaned up thoroughly and removed from the cemetery. The Contractor shall take every precaution to prevent any falling branches or trees from damaging any headstones, adjacent plant material or structures. All stumps shall be removed using stump-grinding equipment. Stumps and all surface roots shall be ground to at least 4" below the soil surface and all ground stump/root wood shall be removed. The hole shall be filled with topsoil, compacted, and then seeded in accordance with contract specifications. All chips and debris from stump removal shall be taken offsite the same day of the work and shall be properly disposed of.

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ATTACHMENT – M

CYPRESS HILLS CONTRACT DRAWINGS

1. Prior to the start of any excavation, perform survey of the section(s) and submit to Contracting Officer & COTR for approval.

2. All existing topography, underground utilities, structures and associated facilities shall be protected from damage. Contractor is to verify all existing structures and facilities and notify engineer of any conflicts or discrepancies prior to starting of work.

3. Contractor shall complete all work for the first three adjacent gravesite rows as identified by the COTR for inspection and approval. Once these rows are accepted, the contractor shall be authorized to begin work on the remaining gravesites. However, no more than ten rows shall be renovated at one time unless approved by the contracting officer in writing.

4. The contractor shall subscribe to all government regulations and shall obtain all necessary public agency permits. The contractor, by using these plans for their work, agree to hold harmless engineer, their employees and agents and against any and all liability, claims, damages and the cost of defense arising out of contractors performance of the work described herein, but not including the sole negligence of the owner, his agents, the engineer, his employees and agents.

5. Stockpiled topsoil which is not replaced during construction shall be removed from the site at the contractor's expense.

6. No burning or incineration of rubbish will be permitted on site.

7. The contractor shall provide for the safe and orderly passage of traffic and pedestrians where his operations abut public thoroughfares and adjacent property. Where roads are closed for construction, the contractor shall provide directional signage of appropriate size and height and placed at the construction boundary fence or as directed by the COTR.

8. Construction operations shall be conducted in such a way as to prevent tracking of mud or soil onto public thoroughfares. At the end of each day, the contractor shall clean up all mud or soil which has been tracked onto public and cemetery streets.

9. Prior to new work the contractor shall field check all dimensions and elevations and verify the location and elevation of existing utility lines and structures within the area of work. Discrepancies shall be reported to the COTR immediately. All field tiles encountered during excavation shall be repaired where practical and promptly reported to the engineer.

10. Before excavating over or adjacent to any existing utilities, notify the owner of such utilities to ensure that protective work will be coordinated and performed by the contractor in accordance with the requirements of the owner of the utility involved. If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered during this operation. They shall be safeguarded, protected from damage and supported if necessary.

11. All sediment shall be prevented from entering any existing storm drainage system. The contractor shall be responsible for removing sediment resulting from this project from storm sewers and drainage structures.

12. Areas outside the construction limit line impacted by operations of the contractor shall be returned to the state it was found prior to new construction, except where new work is shown.

13. All trees shall be protected to the extent possible from damage to trunks, branches and roots. Cutting of tree roots is allowed to the limits of the trenches where new footing are to be placed.

14. Street paving and curbs shall be protected from damage, and If damaged, shall be replaced promptly in conformance with VA standard specifications in materials and workmanship.

15. Provide smooth vertical curves through high and low points. Provide uniform slopes between new and existing grades. Avoid ridges and depressions.

16. Contractor shall maintain accurate records of all underground utility construction and submit “record” information to engineer for use in preparing "record drawings”.

17. Contractor shall be responsible for taking topsoil samples and testing the topsoil to determine necessary additives required for proposed plantings. Landscape contractor shall supply all additives in sufficient quantities to satisfy the recommendations of the testing lab. If topsoil test recommendations conflict with the specifications, landscape contractor shall notify COTR before proceeding with work. Supply copies of lab reports and recommendation to COTR for review.

18. Contractor shall take necessary precautions to prevent injury to all plant materials during digging, handling, planting and maintenance operations.

19. Landscape contractor shall submit detailed maintenance instructions for seed, turf areas and plant materials to the COTR one (1) month prior to the end of the guarantee period.

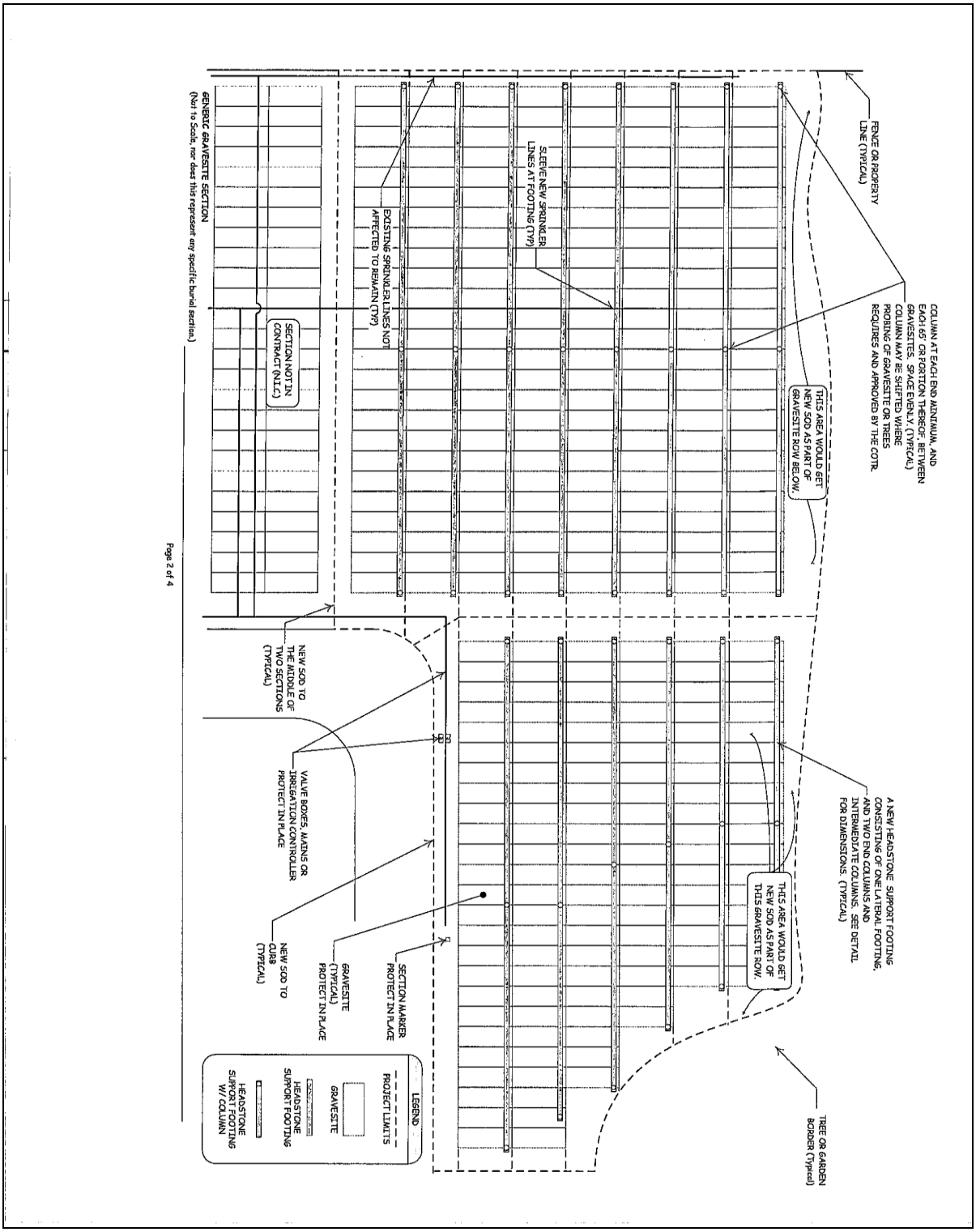
20. Inspect and test sprinkler system within work area prior to starting any work to verify in working condition. Document and submit to the COTR and Contracting Officer any part not in good working condition. Protect existing sprinkler system. Contractor damage will be repaired by contractor at contractor’s expense. Sprinkler lines and heads affected by the placement of the new footing shall be replaced with new. Turn over old sprinkler heads to cemetery. Dispose of old piping. Sleeve footing for new sprinkler piping that crosses footings.

21. The generic gravesite section detail defines and depicts the work area limits of various gravesite rows within a typical gravesite section. It does not depict any particular section at the cemetery.

22. Physical Limits of Turf Work: New seed shall be installed to the full extent of the section, or part thereof, up to the boundary limits as defined by the curbs. Tree or garden edge, fence, property line or mid-way between two sections. See specifications for grading, soil preparation and planting of seed.

23. A typical “Headstone Headstone Support Row” includes the headstone support footing, the associated gravesites that particular headstone footing supports and the area out of the turf boundary limits of that particular headstone support row. See typical gravesite section detail.

ATTACHMENT - M.1



GENERIC GRAVESITE SECTION
(Not to Scale, nor does this represent any specific burial section.)

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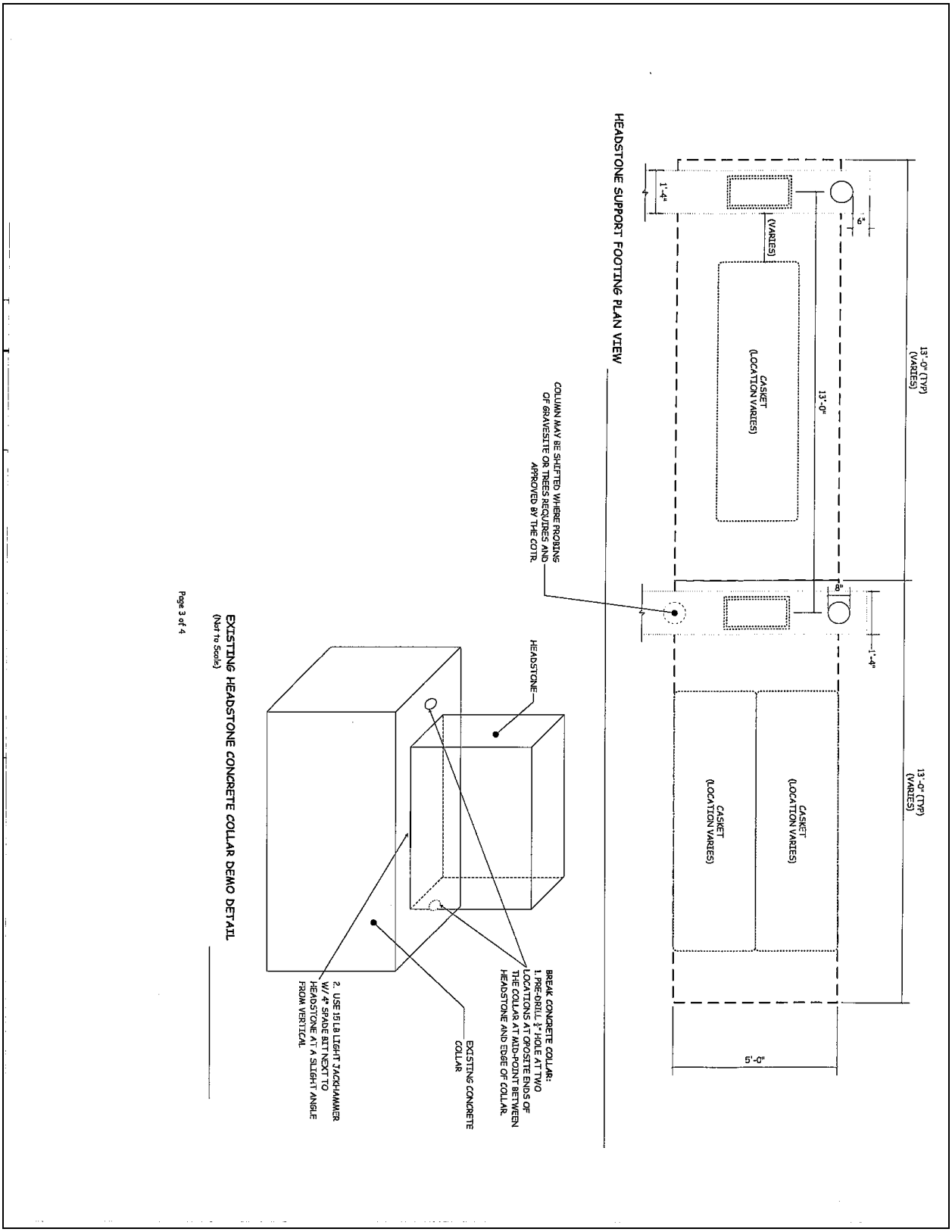
ATTACHMENT – M.2



EXISTING HEADSTONE CONCRETE COLLAR DEMO DETAIL

(Not to Scale)

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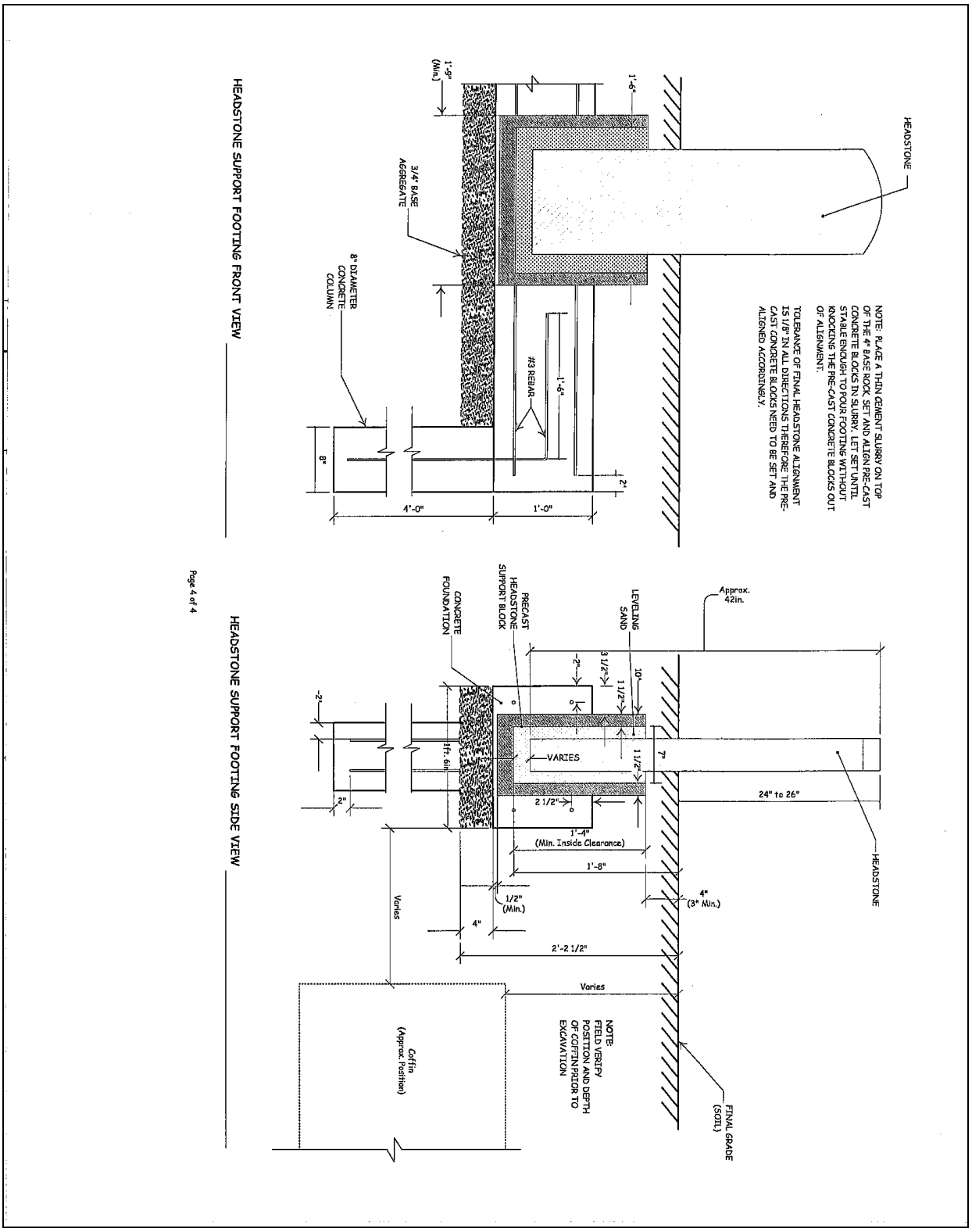
ATTACHMENT – M.3



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